KEY_Lesson27_BarCharts_Histograms

December 10, 2021

1 Bar Charts and Histograms

1.1 Bar Charts

Bar charts are used to display how a *categorical* variable relates to a *continuous* variable. In bar charts the *categorical* varibale is displayed on the x-axis and the *continuous* variable is displayed on the y-axis.

- Categorical variables are variables with different categories or groups.
  - Examples: gender, city
- Continuous variables are numeric variables.
  - Examples: time, height, length

[1]:
```
# import seaborn, matplotlib
import seaborn as sns
import matplotlib.pyplot as plt
# set up inline figures
%matplotlib inline
```

We will be using the titanic dataset in this example. Let's load and preview it.

[2]:
```
# read in titanic data
titanic = sns.load_dataset("titanic")
# preview data
titanic.head()
```

[2]:

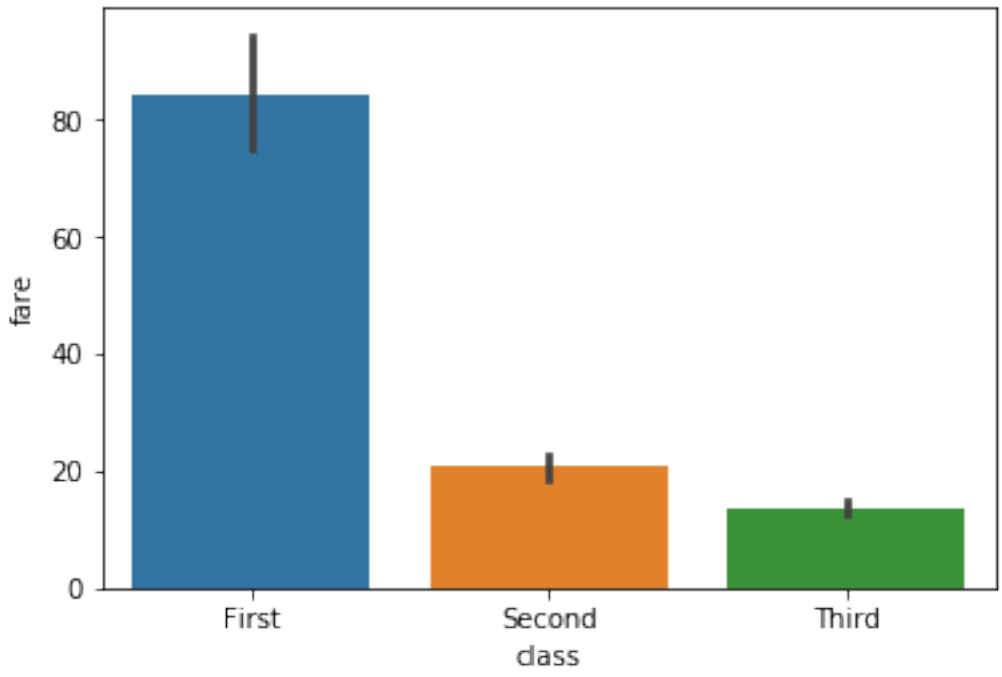
	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	\
0	0	3	male	22.0	1	0	7.2500	S	Third	
1	1	1	female	38.0	1	0	71.2833	C	First	
2	1	3	female	26.0	0	0	7.9250	S	Third	
3	1	1	female	35.0	1	0	53.1000	S	First	
4	0	3	male	35.0	0	0	8.0500	S	Third	

	who	adult_male	deck	embark_town	alive	alone
0	man	True	NaN	Southampton	no	False
1	woman	False	C	Cherbourg	yes	False
2	woman	False	NaN	Southampton	yes	True
3	woman	False	C	Southampton	yes	False
4	man	True	NaN	Southampton	no	True

Let's say we want to compare the mean fare price across the three classes of tickets for all passengers.

[3]:
```
# barplot of class vs fare
sns.barplot(x="class", y = 'fare', data=titanic)
```

[3]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x115cb1780>
```

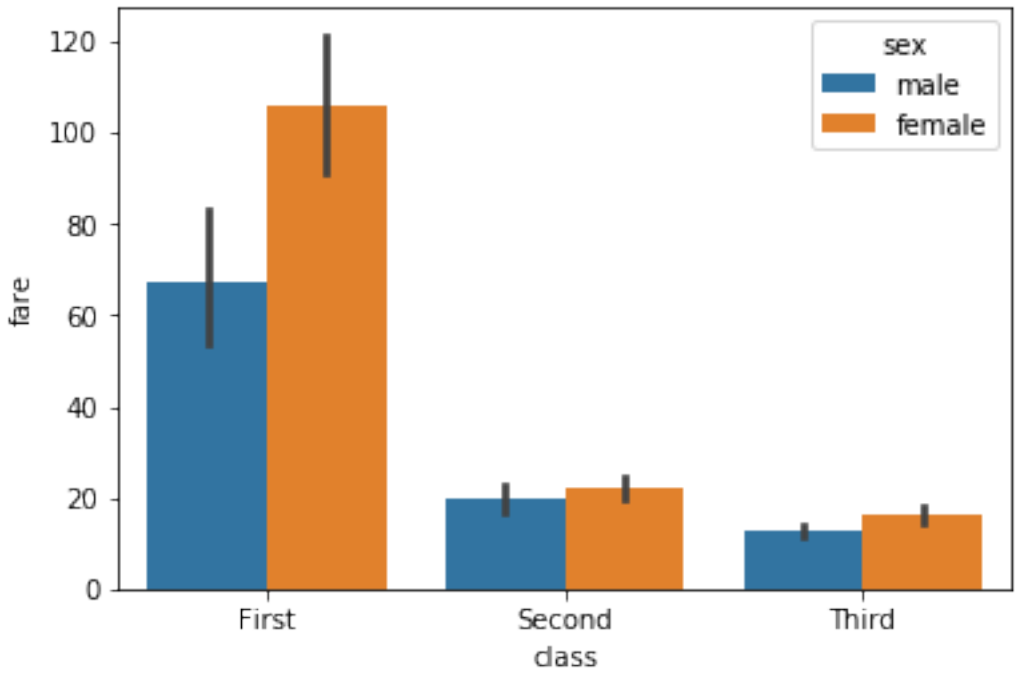


Notice how `seaborn` magically computes the mean fares and generates the plot exactly as we want without us even specifying!

What if we wanted to look at the data more granularly and further *stratify* each `class` bar by the `sex` variable? Based on what you know about `seaborn` so far, how do you think we can do that?

[4]:
```
# barplot of class vs fare stratified by sex
sns.barplot(x="class", y = 'fare', hue = "sex", data=titanic)
```

[4]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x1192bbba8>
```



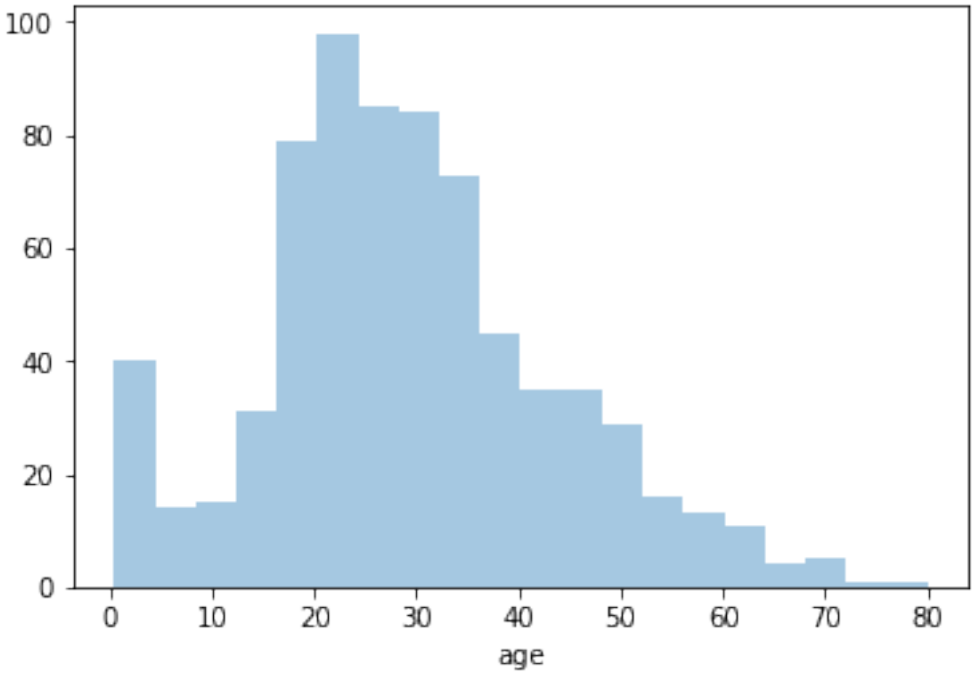
1.2 Histograms

Histograms are used to visualize the *distribution* of a *continuous* variable.

Let's say we wanted to see how the `age` was distributed across all passengers in our dataset. We can use the `distplot` function to generate our histogram.

[5]:
```
# histogram of age
sns.distplot(titanic['age'].dropna(), kde=False)
```

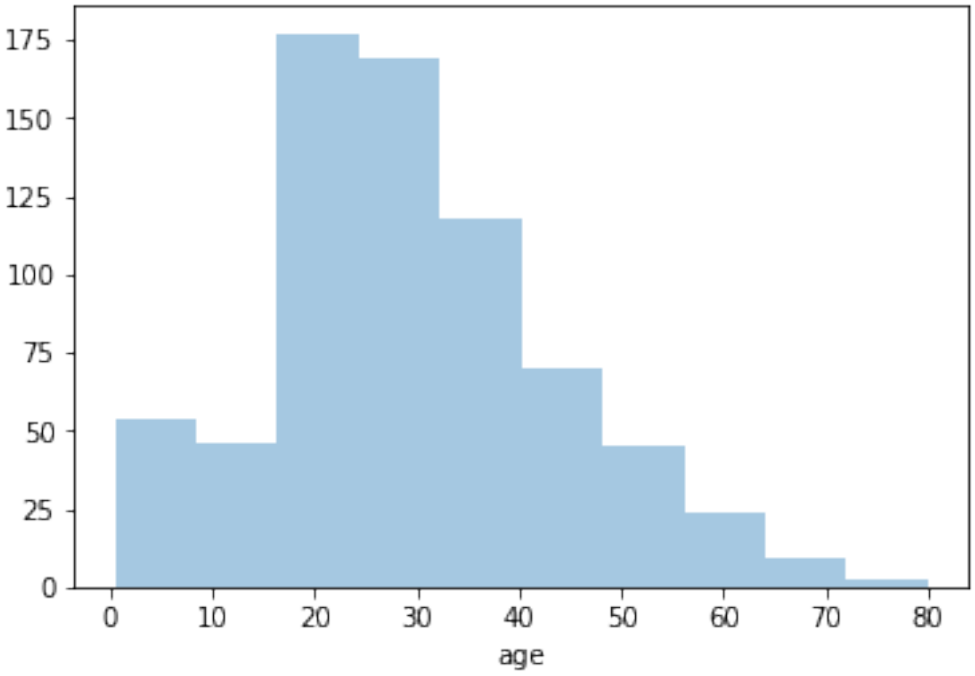
[5]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x119367198>
```



We can change the number of bins used to plot our histogram to change the *granularity* of our distribution plot.

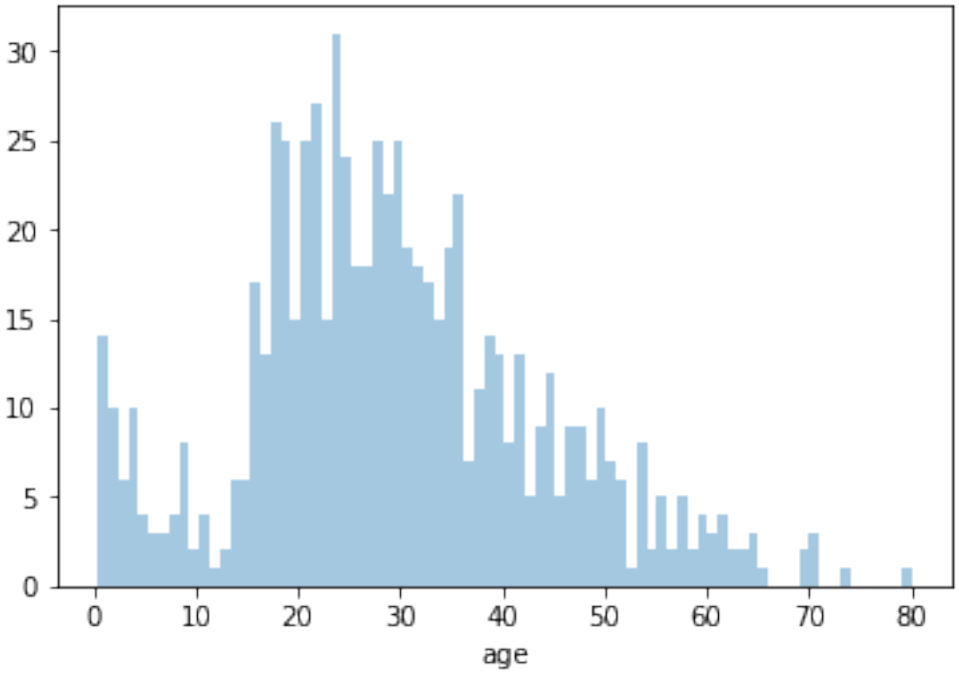
[6]:
```
# histogram of age
sns.distplot(titanic['age'].dropna(), kde=False, bins=10)
```

[6]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x119428080>
```



[7]:
```
# histogram of age
sns.distplot(titanic['age'].dropna(), kde=False, bins=80)
```

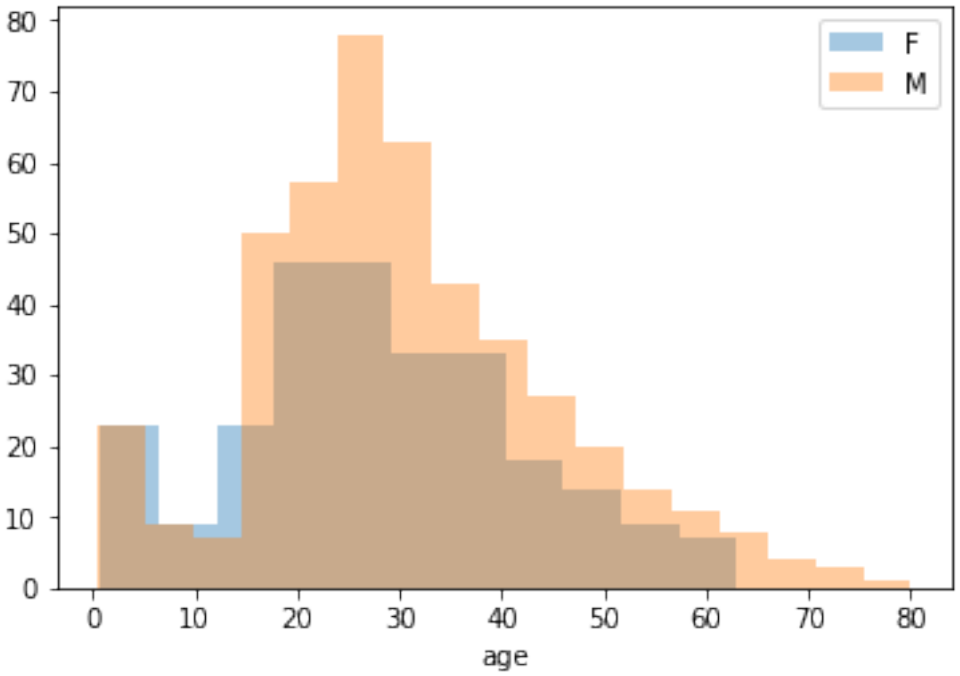
[7]: <matplotlib.axes._subplots.AxesSubplot at 0x1194b5518>



Unfortunately we can't color our histograms by another variable, but we can compare the distributions of certain variables between *subsets* of our DataFrame by *layering* them.

[8]:
```
# histogram of age for females
sns.distplot(titanic.query('sex == "female"')['age'].dropna(), kde=False,␣
↪label="F")
sns.distplot(titanic.query('sex == "male"')['age'].dropna(), kde=False,␣
↪label="M")
plt.legend()
```

[8]:
```
<matplotlib.legend.Legend at 0x119436978>
```



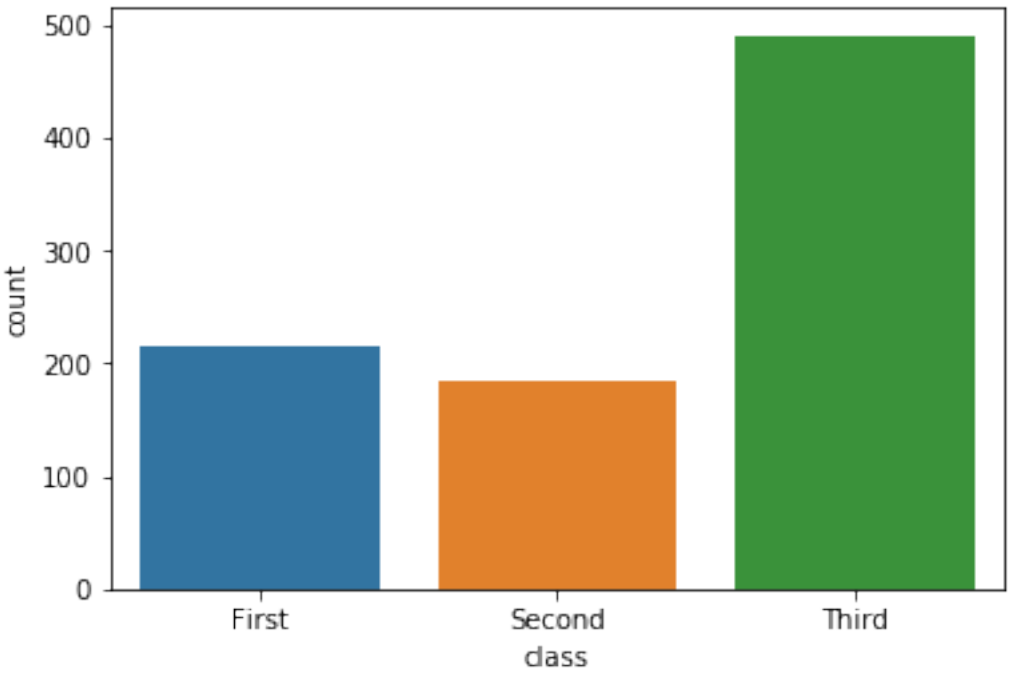
1.3 Count Plots

Count plots can be thought of as histograms for categorical variables.

Let's say we wanted to visualize how many passengers there were in each `class`.

[9]:
```
# count plot of class
sns.countplot(x="class", data=titanic)
```

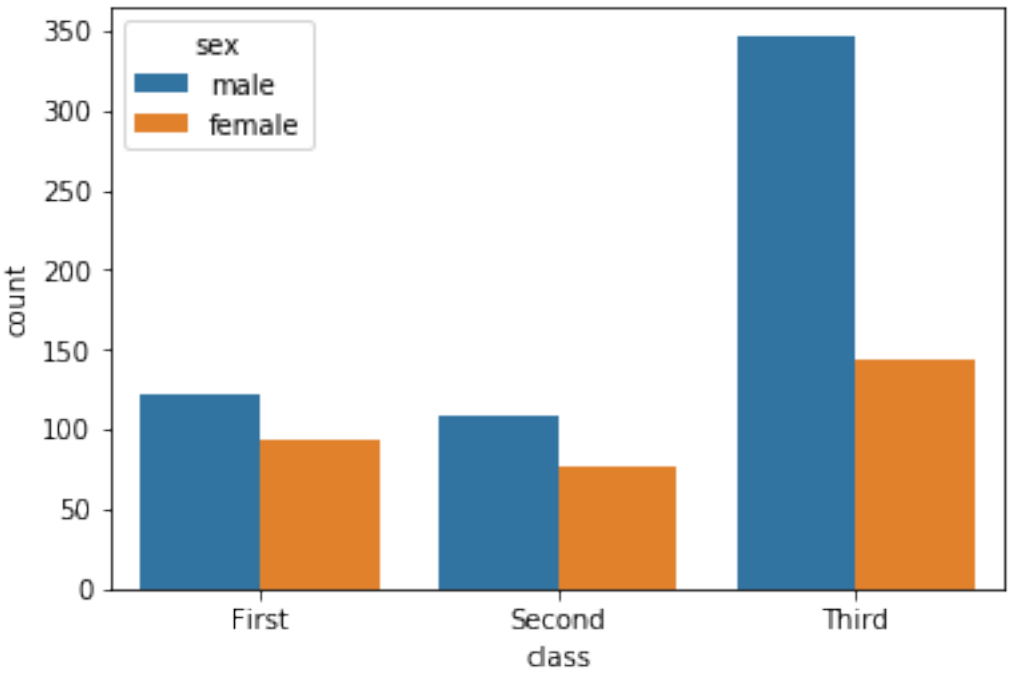
[9]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x119585828>
```



Now, let's stratify each class by the `sex` variable using color. By now you're an expert in this!

[10]:
```
# stratify class by sex variable
sns.countplot(x="class", hue = "sex",  data=titanic)
```

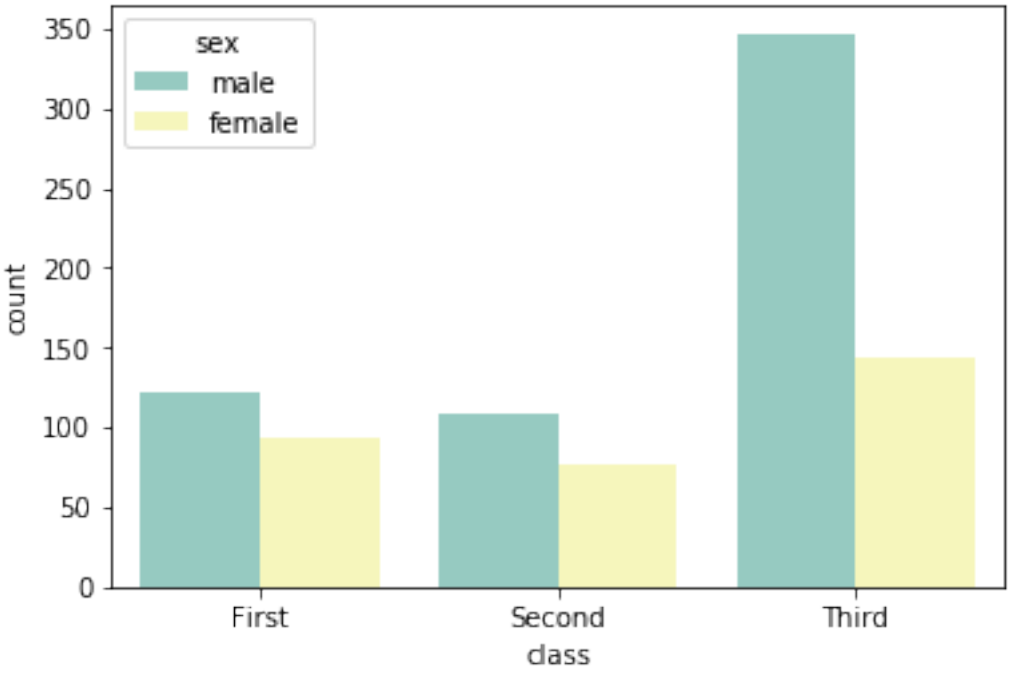
[10]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x1198e82e8>
```



As always we can change the color palette:

[11]:
```
# change color palette
sns.countplot(x="class", hue = "sex", palette = "Set3", data=titanic)
```

[11]: <matplotlib.axes._subplots.AxesSubplot at 0x1199a0e80>



In this lesson you learned: * How to create barplots in seaborn * How to stratify barplots by another variable using color (`hue`) * How to create histograms in seaborn * Changing the granularity of the histograms (`bins`) * How to create count plots in seaborn * How to stratify count plots by another variable using color (`hue`)